

CLAIMS

1. An electrostatic-painting spray gun including an atomizer provided at the forward end thereof and an external charging electrode disposed outside, and projected ahead of, the atomizer while being separated, with an electric insulation being kept, from a passage through which a paint is supplied to the atomizer; wherein:
 - the apparatus is a hand-held spray gun including an electroconductive grip provided at the back of the atomizer; and
 - the external electrode includes an electrode body formed from an insulative material and having a charging electrode provided being exposed at the forward end thereof and a plug-in portion formed at the rear end thereof,
 - the external electrode being able to freely be connected to, and disconnected from, an electrode receptacle to which a high voltage output is connected.
2. The apparatus according to claim 1, wherein the electrode receptacle is provided at the back of the atomizer.
3. The apparatus according to claim 1, wherein a first high-resistance resistor is provided between the high voltage output and electrode receptacle and a second high-resistance resistor is provided at the forward-end electrode of the external electrode.
4. The apparatus according to claim 1, wherein:
 - the plug-in portion of the external electrode has an electric connector for connection with the high voltage output; and
 - the distance between the electric connector and the exposed end of the outer surface of the electrode receptacle is sufficiently long to prevent creepage discharging.

5. An electrostatic-painting spray gun including an atomizer provided at the forward end thereof and an external charging electrode disposed outside, and projected ahead of, the atomizer while being separated, with an electric insulation being kept, from a passage through which a paint is supplied to the atomizer; wherein:

there is provided outside the apparatus an electrode receptacle to which a high voltage output is connected;

the external electrode includes an electrode body formed from an insulative material and having a charging electrode provided being exposed at the forward end thereof and a plug-in portion formed at the rear end thereof, the external electrode being able to freely be connected to, and disconnected from, the electrode receptacle; and

there is provided a corrugated boundary surface between an electric connector and an exposed end of the outer surface of the plug-in portion to provide a long creepage distance.

6. The apparatus according to claim 1 or 5, wherein:

the external electrode has the charging electrode exposed at the forward end thereof; and

the electrode body formed from the insulative material has at least a part thereof, as a bendable portion, formed from a resilient material.

7. The apparatus according to claim 1 or 5, wherein the external electrode has the charging electrode exposed at the forward end thereof; and

the electrode body formed from the insulative material has at least a part thereof formed to be lower in strength than the electrode receptacle at the apparatus body.

8. An external charging-type electrostatic-painting spray gun including an atomizer provided at the forward end thereof and a charging electrode provided outside the atomizer while being separated, with an electrical insulation being kept, from a passage through which a paint is supplied to the atomizer, wherein:

a high voltage output terminal is provided short of a position where the paint atomization is started by the atomizer and across a high-resistance resistor; and

a forward-end electrode is positioned 30 to 80 mm ahead of the atomization starting position, away from the paint spray flow and as near to the paint spray flow as possible.

9. The apparatus according to claim 8, wherein the forward-end electrode of the external electrode is positioned outside of the center axis of spraying and within a range not exceeding a half of a forward-going direction from the atomization starting position.

10. An external charging-type electrostatic-painting spray gun including an atomizer provided at the forward end thereof and a charging electrode provided outside the atomizer while being separated, with an electrical insulation being kept, from a passage through which a paint is supplied to the atomizer, wherein a forward-end electrode is disposed in such a manner that any streamer discharge will be prevented from occurring toward a paint spray nozzle of the atomizer and the electrode will gradually be opened from the center axis of spraying as it goes away from the end of spray not to be applied with the end of paint spray flow.

11. An electrostatic-painting spray gun including a high-resistance resistor of more than $150\text{ M}\Omega$ provided between a forward-end electrode and high voltage output,

wherein the forward-end electrode is disposed in such a manner that in case the discharge current from the forward-end electrode be maintained at 60 to 150 μ A with a charging voltage of -70 kV being applied, any streamer discharge will be prevented from occurring toward a paint spray nozzle of the atomizer and the electrode will gradually be opened from the center axis of spraying as it goes away from the end of spray not to be applied with the end of paint spray flow.

12. The apparatus according to claim 10 or 11, wherein:

an external electrode can be separated from a high voltage output terminal; and
the angle at which an electrode receptacle provided at the side of the apparatus is
larger in the forward direction.